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Source Assessment: Overview Matrix for National Criteria Pollutant Emissions

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16. ABSTRACT The report alphabetically lists stationary sources that emit criteria pollutants. The overview matrix was prepared, using a computerized data base established for emissions of air pollutants from approximately 600 stationary source types in the combustion, organic materials, inorganic materials, and open source categories. The matrix lists the total national emissions of criteria pollutants emitted by source type. (A source type is defined as a group of emission sources which have the same process and emission characteristics.)

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SOURCE ASSESSMENT: OVERVIEW MATRIX FOR NATIONAL CRITERIA POLLUTANT EMISSIONS

by

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PREFACE

The Industrial Environmental Research Laboratory (IERL) of EPA has the responsibility for insuring that pollution control technology is available for stationary sources to meet the requirements of the Clean Air Act, the Federal Water Pollution Control Act and solid waste legislation. If control technology is unavailable, inadequate, uneconomical or socially unacceptable, then financial support is provided for the development of the needed control techniques for industrial and extractive process industries. The Chemical Processes Branch of the Industrial Processes Division of IERL has the responsibility for investing tax dollars in programs to develop control technology for a large number (>500) of operations in the chemical industries.

Monsanto Research Corporation (MRC) has contracted with EPA to investigate the environmental impact of various industries which represent sources of pollution in accordance with EPA's responsibilities as outlined above. Dr. Robert C. Binning serves as MRC Program Manager in this overall program entitled, "Source Assessment," which includes the investigation of sources in each of four categories: combustion, organic materials, inorganic materials, and open sources. Dr. Dale A. Denny of the Industrial Processes Division at Research Triangle Park serves as EPA Project Officer. Reports prepared in this program are of three types: Source Assessment Documents, State-of-the-Art Reports, and Special Project Reports.

Source Assessment Documents contain data on emissions from specific industries. Such data are gathered from the literature, government agencies and cooperating companies. Sampling and analysis are also performed by the contractor when the available information does not adequately characterize the source emissions. These documents contain all of the information necessary for IERL to decide whether a need exists to develop additional control technology for specific industries.

State-of-the-Art Reports include data on emissions from specific industries which are also gathered from the literature, government agencies and cooperating companies. However, no extensive sampling is conducted by the contractor for such industries. Sources in this category are considered by EPA to be of insufficient priority to warrant complete assessment for control technology decision making. Therefore, results from such studies

are published as State-of-the-Art Reports for potential utility by the government, industry, and others having specific needs and interests.

Special projects provide specific information or services which are applicable to a number of source types or have special utility to EPA but are not part of a particular source assessment study. This special project report, "Source Assessment: Overview Matrix for National Criteria Pollutant Emissions," was prepared to provide an alphabetical listing of stationary sources that emit criteria pollutants.

ABSTRACT

This report provides an overview matrix or alphabetical listing of stationary sources that emit criteria pollutants. The matrix shows the relative importance of source types in terms of their effect on the total national emissions burden and overall ambient air quality. A source type is defined as a group of emission sources which have the same process and emission characteristics.

The overview matrix was prepared using a computerized data base established for emissions of air pollutants from approximately 600 stationary source types in the combustion, organic materials, inorganic materials, and open source categories. Emissions included in the data base consist of criteria pollutants (i.e., particulates, sulfur dioxide, nitrogen oxides, hydrocarbons, and carbon monoxide) and noncriteria pollutants (such as trace metals and polycyclic organic matter). The data base is updated continuously to incorporate related new findings and covers a large number of source types; however, it is not an exhaustive list of all stationary emission points in the U.S.

This report was submitted in partial fulfillment of Contract 68-02-1874 by Monsanto Research Corporation under the sponsorship of the U.S. Environmental Protection Agency. The updated listing in this report is similar to those generated for internal EPA use in July 1975, July 1976, and September 1976. This report was prepared during the period May-June 1977.

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SYMBOLS

C	-- code number which identifies the source category
CO	-- carbon monoxide
HC	-- hydrocarbons
NOX	-- nitrogen oxides
PART	-- particulates
SO2	-- sulfur dioxide

SECTION 1

INTRODUCTION

During the performance of the Source Assessment Program for EPA on Contract 68-02-1874, a computerized data base was established for emissions of air pollutants from approximately 600 stationary source types in the combustion, organic materials, inorganic materials, and open source categories. A source type is defined as a group of emission sources which have the same process and emission characteristics, e.g., rubber processing, beef cattle feedlots, etc. Emissions included in the data base consist of criteria pollutants (i.e., particulates, sulfur dioxide, nitrogen oxides, hydrocarbons, and carbon monoxide) and noncriteria pollutents (such as trace metals and polycyclic organic matter).

The data base is updated continuously to incorporate related new findings from the investigation of individual emission source types on this program. Although the data base covers a large number of source types, it is not an exhaustive list of all stationary emission points in the U.S. The source list was selected to cover over 90% of the emissions in those areas under the original jurisdiction of EPA's Chemical Processes Branch at IERL-RTP. In other areas, such as metallurgical processes, some additional source types were later added to the data base to provide a better coverage of national emissions. However, this coverage is by no means as complete as that for the four categories selected for intensive study.

Using the above computerized data base, this overview matrix was prepared to provide an alphabetial listing of stationary source types and their national total emissions of criteria pollutants. The matrix shows the relative importance of source types in terms of their effect on the total national emissions burden and overall ambient air quality. A detailed state-by-state listing of stationary emission sources which emit at least 1% of each state's total mass emissions of any criteria pollutant is given in a separate report entitled "Source Assessment: State-by-State Listing of Criteria Pollutant Emissions." Non-criteria pollutants are not included in this report.

The following explanatory remarks are provided for this report:

1. All emissions are expressed as 10^3 kg/yr (metric ton/yr).

3. Every computer-printed page lists criteria pollutants coded as PART (particulates), SOX (sulfur dioxide), NOX (nitrogen oxides reported as NO_2), HC (hydrocarbons), and CO (carbon monoxide).

5. The last column, designated C, identifies the source category as follows:

Code	Category
1	Combustion Sources
2	Organic Materials Sources
3	Inorganic Materials Sources
4	Open Sources

4. The national emission totals for particulates and SO_2 were obtained from the data base for stationary sources. The totals for NO_x, CO, and hydrocarbons were obtained from the National Emissions Data System (NEDS) 1972 Emissions Report (1) which includes mobile and stationary sources. The totals have been adjusted to include New York point sources, forest wild fires, agricultural open burning, structural fires, coal refuse fires, and metallurgical processing.

5. Line one for each source type shows the annual mass of specific emissions. Line two shows the percent contribution of a particular criteria pollutant based on the total amount of that pollutant emitted from all source types (i.e., stationary sources) in the data base. Line three shows the percent contribution of a particular criteria pollutant based on the amount of that pollutant emitted from stationary and mobile sources (i.e., using particulate and SO_2 data from the data base, and NO_x, CO, and hydrocarbon data from NEDS).

6. All emissions data are rounded to four significant figures; percentages are rounded to three significant figures.

7. For source types that emit less than 100 kg of each criteria pollutant, dashes (--) are shown for all emissions.

8. Hydrocarbon totals for each source type include unnamed hydrocarbons and all named nonmethane organic materials.

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(1) National Emissions Report, 1972. EPA-450/2-74-012. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, June 1974. 423 pp.

9. Particulates are the only criteria pollutant considered in this overview matrix for open sources. When that column is blank, it indicates that no particulates are emitted.

10. The overview matrix presented in this report is based on the data base contents as of 14 June 1977.

Example:

The glass industry emits the following amounts of criteria pollutants:

Particulates:	$24,730 \times 10^3$ kg/yr
SO_x:	$26,410 \times 10^3$ kg/yr
NO_x:	$60,100 \times 10^3$ kg/yr
Hydrocarbons:	$1,289 \times 10^3$ kg/yr
Carbon monoxide:	$8,520 \times 10^3$ kg/yr

Criteria pollutants emitted by the glass industry contribute the following portions of the total amounts of such pollutants emitted from all stationary sources in the U.S. (as contained in the data base):

Particulates:	0.0187%
SO_x:	0.108%
NO_x:	0.735%
Hydrocarbons:	0.0190%
Carbon monoxide:	0.00947%

Criteria pollutants emitted by the glass industry contribute the following portions of the total amounts of such pollutants emitted from stationary and mobile sources in the U.S. (using particulate and SO_x data from the data base, and NO_x, CO and hydrocarbon data from NEDS):

Particulates:	0.0187%
SO_x:	0.108%
NO_x:	0.305%
Hydrocarbons:	0.013%
Carbon monoxide:	0.00875%

SECTION II

OVERVIEW MATRIX FOR NATIONAL CRITERIA POLLUTANT EMISSIONS

Data from NEDS and the following reference sources are included in the data base which was used to generate the overview matrix:

Journals

Chemical Abstracts
Chemical and Engineering News
Chemical and Process Engineering
Chemical Engineering
Chemical Engineering Progress
Chemical Engineering Science
Chemical Marketing Reporter
Chemical Technology
Chemical Week
Engineering Index
Environment
Environmental Science and Technology
Hydrocarbon Processing
Industrial and Engineering Chemistry
Journal of the Air Pollution Control Association
Journal of the American Chemical Society
Journal of the Chemical Society (London)
Journal of Organic Chemistry
Journal of Physical Chemistry
Journal of the Water Pollution Control Association
Modern Physics
Oil and Gas Journal
Pollution Abstracts

Books, Manuals, Reports

Air Pollution Engineering Manual, Second Edition, J. A. Danielson, ed. Publication No. AP-40, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, May 1973. 987 pp.

Chemical Engineer's Handbook, Fifth Edition. J. H. Perry and C. H. Chilton, eds. McGraw-Hill Book Company, New York, New York, 1973.

Compilation of Air Pollutant Emission Factors. Publication No. AP-42, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, March 1975.

Pervier, J. W., R. C. Barley, et al. Survey Reports on Atmospheric Emissions from the Petrochemical Industry, Volumes I-IV. EPA-450/1-73-005a-d, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, April 1974.

Kirk-Othmer Encyclopedia of Chemical Technology, Second Edition, Volumes 1-23. John Wiley & Sons, Inc., New York, New York, 1969.

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1. National Emissions Report, 1972. EPA-450/2-74-012, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. June 1974. 433 pp.